

ABSTRACT OF THE DISCLOSURE

There is provided a system for pumping thermal energy. The system includes (a) a membrane permeator for removing vapor from a process gas and for
5 providing a vapor-depleted process gas, and (b) a gas-liquid contactor for adding vapor from a liquid to a vapor-depleted gas to produce a vapor-added process gas. The system transfers a quantity of thermal energy from the liquid to the vapor-added process gas, and is also capable of upgrading the thermal energy to a higher temperature. The system may be used for various heat pump applications
10 including chilling and waste heat or low level heat recovery.